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APPLICATION OF LANDSAT SYSTEM FOR IMPROVING METHODOLOGY FOR
INVENTORY AND CLASSIFICATION OF WETLANDS

CR-148823

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8 October 1976

Type II Progress Report for Period 1 July to 30 September 1976

Prepared for:
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

(E76-10503) APPLICATION OF LANDSAT SYSTEM
FOR IMPROVING METHODOLOGY FOR INVENTORY AND
CLASSIFICATION OF WETLANDS Progress Report,
1 Jul. - 30 Sep. 1976 (Northern Prairie
Wildlife Research Center) 8 p HC \$3.50

N76-33592

Unclas
G3/43 00503

Publication authorized by the Director, U. S. Fish and Wildlife
Service

23000

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SIS/902.6

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Application of LANDSAT system for improving methodology for inventory and classification of wetlands.		5. Report Date 8 October 1976	
		6. Performing Organization Code	
7. Author(s) David S. Gilmer (IN 300) and Edgar A. Work, Jr. <i>eto</i>		8. Performing Organization Report No.	
9. Performing Organization Name and Address U. S. Fish and Wildlife Service Northern Prairie Wildlife Research Center Jamestown, North Dakota 58401		10. Work Unit No.	
		11. Contract or Grant No. S-54049A	
12. Sponsoring Agency Name and Address Mr. Harold Oseroff, Code 902 Goddard Space Flight Center Greenbelt, Maryland 20771		13. Type of Report and Period Covered Type II Progress Rept. 1 July - 30 September 1976	
		14. Sponsoring Agency Code	
15. Supplementary Notes			
16. Abstract <p>Approximately 29 percent of the aircraft MSS data has not been received from NASA/JSC; however, the data now on hand will satisfy our work requirements through October. Considerable effort has been devoted toward the processing of LANDSAT MSS data for detection of surface water features present during the May and July 1975 periods. This effort is approximately 75 percent completed. Weather conditions resulted in some loss in coverage (about 20 percent) during the May period but July coverage was nearly 100 percent of our study area (USF&WS Survey Stratum 46). Based on a qualitative analysis of our thematic maps (LANDSAT) abundant sheet water was present in the Coteau and Drift Plain of North Dakota during May 1975. Quantitative analysis of water conditions will be made as soon as statistical tabulation have been generated.</p>			
17. Key Words		18. Distribution Statement	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page)	21. No. of Pages 5	22. Price

Type II Progress Report
LANDSAT-2

Title: Application of LANDSAT system for improving methodology for inventory and classification of wetlands

LANDSAT Proposal No.: 23000

GSFC ID No. of P.I.: 300

A. Problems

A large portion of the requested aircraft MSS data was received during September. Approximately 29 percent of the requested data have not yet been shipped from NASA/JSC. The data now on hand will satisfy our work requirements through October.

B. Accomplishments

A major effort conducted during this reporting period has been the processing of LANDSAT MSS data received early in the reporting period. Data representing May and July 1975 scenes were processed for the detection of surface water features. Processing of these data is now approximately three-quarters completed. The May data set consists of LANDSAT observations made on 4, 5, and 12 May 1975 (observation numbers 5015-16344, 5015-16350, 5016-16402, and 2110-16373). These observations include approximately 80 percent of the U. S. Fish and Wildlife Service's (FWS) waterfowl breeding ground survey stratum number 46. Not all of the stratum was observed during May due to cloud cover.

The July data set is comprised of LANDSAT observations made on 7, 14, and 15 July 1975 (observation numbers 2266-16484, 5086-16252, 5087-16304, and 5087-16310) and includes nearly 100 percent of the stratum. Our data processing efforts are being conducted according to the procedures shown in Figure 1. Operations listed in blocks 6 and 8 of this figure have yet to be accomplished.

In carrying out the above processing efforts, the location in a data set of certain geographic areas of interest has been facilitated using a newly developed software program which permits an accurate solution of the intersection of a polygonal test site with a rectangular LANDSAT image. By use of a graphics display terminal, a direct visual presentation of the situation is given to the operator who can then enter and store points of interest through the use of the screen cursor. The program also permits the entry of points in either UTM or line/point coordinate systems. Conversion is accomplished on a point by point basis permitting the mixing of input modes.

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C. Significant Results

One result of the processing described above has been thematic maps of surface water for a portion of FWS survey stratum 46. The presence of large amounts of surface water, particularly during the May period, is readily apparent in the photoreduced thematic maps (Figs. 2 and 3). Sheet water comprises much of the water detected in the May scene (Fig. 2). Spring sheet water tends to be ephemeral and occurs as a result of an ice seal which exists within the underlying soil, temporarily preventing the percolation of water. The abundance of water in the May scene is also a result of unusually heavy precipitation which occurred during the spring and the previous fall. A qualitative analysis of the July map (Fig. 3) indicates surface water is less abundant than during the previous May; however, surface water present in the July 1975 LANDSAT scene was unusually abundant compared to other midsummer LANDSAT scenes obtained since 1972. This condition was particularly apparent for the drift plain. Extensive spring flooding occurred in the Red River and Souris Valleys to the east and north of our study sites due to heavy spring run off in 1975. Quantitative analyses of water conditions in our study area will be possible once the statistical tabulations have been generated.

D. Publications

Gilmer, D. S., A. T. Klett, and E. A. Work. 1976. Monitoring breeding habitat of migratory waterfowl, pages 321-325 in R. S. Williams and W. D. Carter (eds.) ERTS-1 a new window on our planet. Geological Survey Professional Paper 929. USGPO, Washington, D. C. 362pp.

E. Recommendations

None

F. Funds Expended

<u>Total Expenditures Allowed</u>	<u>Expenditures during this reporting period</u>	<u>Cumulative Expenditures</u>
\$130,233*	\$18,100	\$57,500

*Amount is exclusive of data purchase allowances.

G. Data Use

	<u>Value of data allowed*</u>	<u>Value of data ordered</u>	<u>Value of data received</u>
Imagery (#G23000)	\$6800.00	0.0	\$5471.00

CCT (#GB30000)	\$3600.00	0.0	\$2000.00
Aircraft (#GW30000)	\$7920.00	0.0	\$5967.00

*NASA/GSFC funded accounts at EROS Data Center, Sioux Falls, SD

H. Aircraft Data

Much of the required aircraft MSS data is now on hand. We anticipate processing these data during the forthcoming reporting period. The aircraft MSS represents a second tier of information to be utilized in a double stage statistical sampling design.

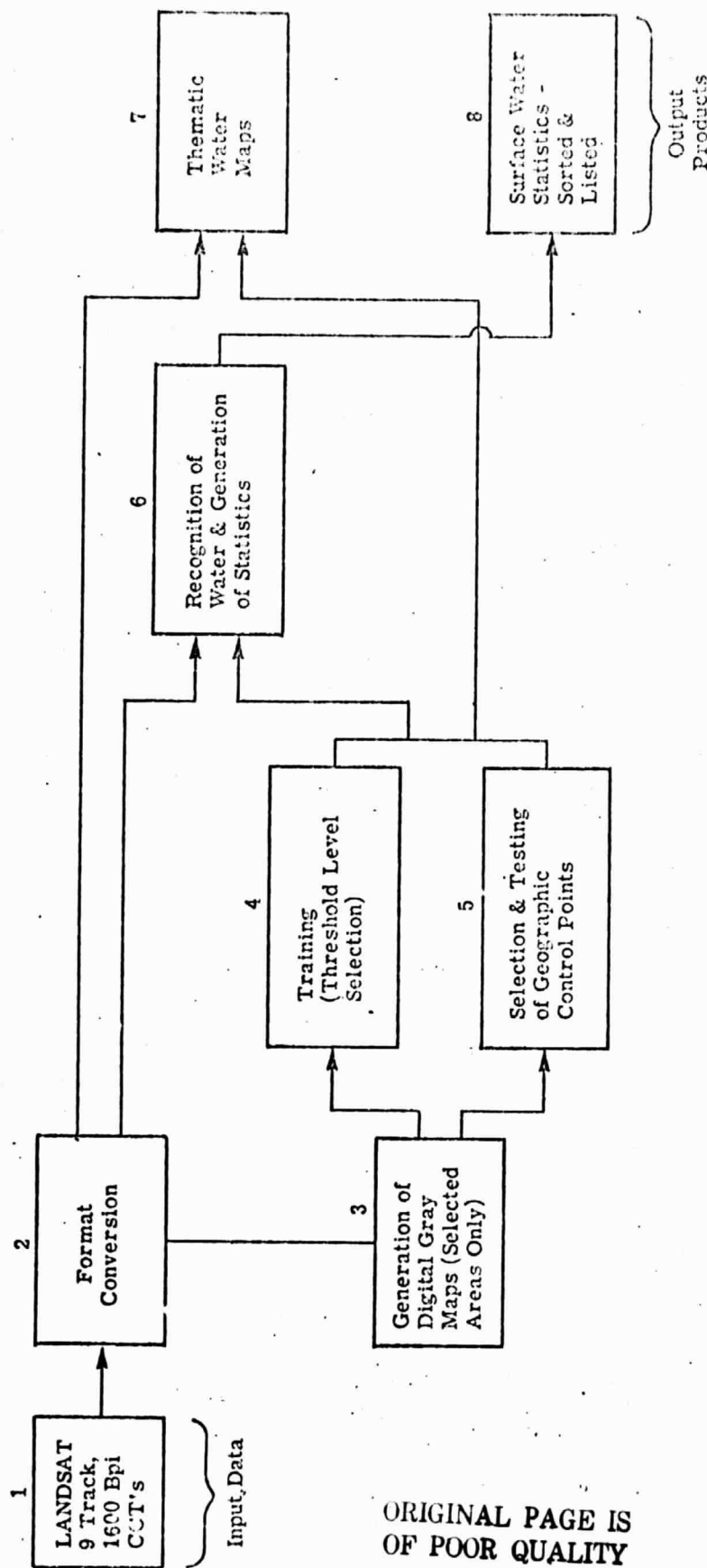


FIGURE 1. DATA FLOW AND PROCESSING OPERATIONS FOR THE SURVEY OF SURFACE WATER FEATURES
USING LANDSAT MSS COMPUTER COMPATIBLE TAPES.

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FIGURE 2. COMPUTER GENERATED WATER MAP FROM THE LANDSAT OBSERVATION 5015-16344 OF 4 MAY 1975. Only partial coverage of the area shown was available during this period due to atmospheric obscurations. Major surface water features and the biotic regions encompassed in the image are indicated. Approximate scale - 1:500,000.

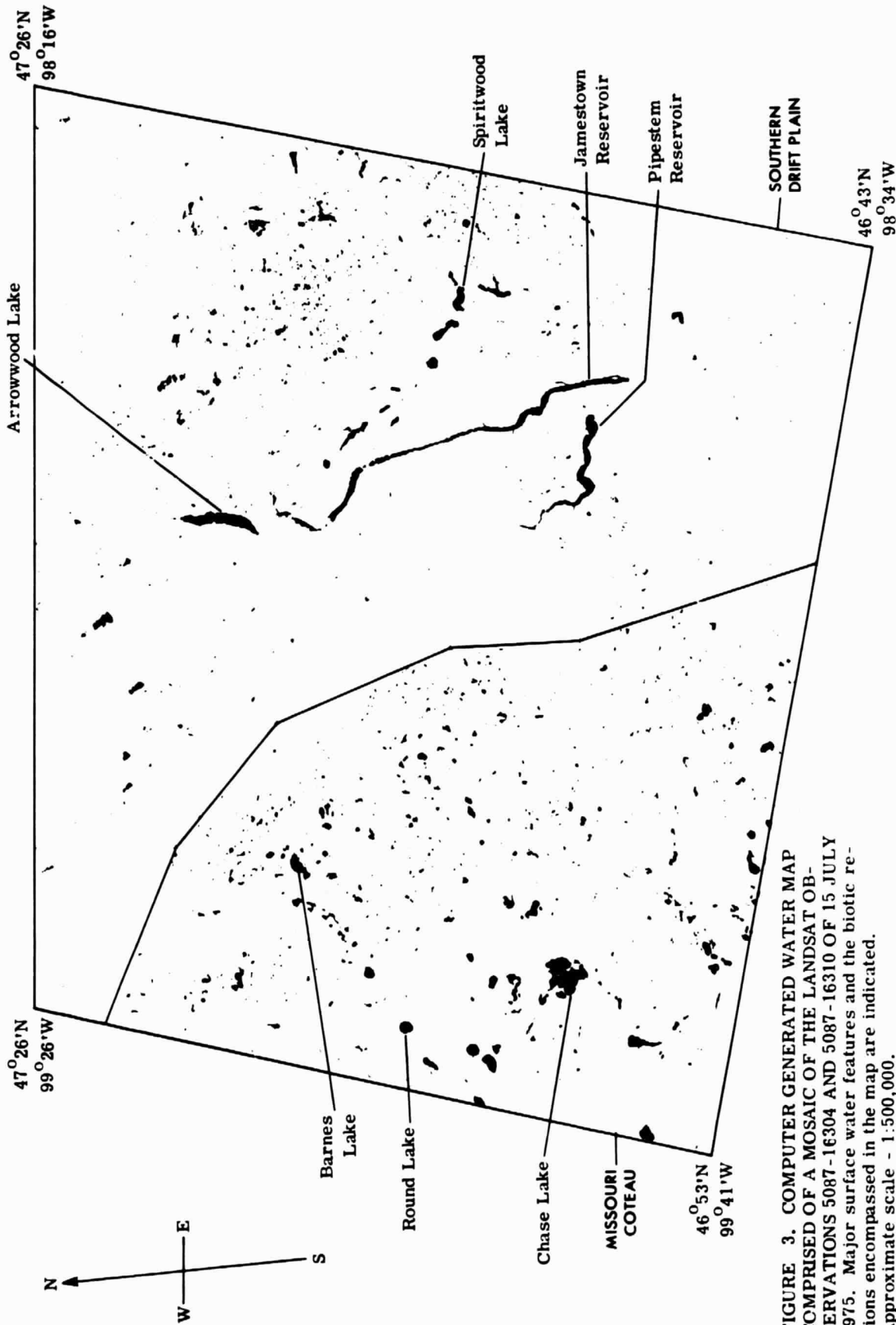


FIGURE 3. COMPUTER GENERATED WATER MAP COMPRISED OF A MOSAIC OF THE LANDSAT OBSERVATIONS 5087-16304 AND 5087-16310 OF 15 JULY 1975. Major surface water features and the biotic regions encompassed in the map are indicated. Approximate scale - 1:500,000.